Academy
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Integration par partie.

P : polynôme

$\int \underbrace{P}_{u} \cdot \underbrace{\text{trigo}}_{v'}$ ou $\int \underbrace{P}_{v'} \cdot \underbrace{\ln}_{u}$ ou $\int \underbrace{P}_{u} \cdot \underbrace{\exp}_{v'}$.

Exemples

$$I = \int_1^e x \ln x \, dx.$$

posons $u(x) = \ln x$; $u'(x) = \frac{1}{x}$.

$v'(x) = x$; $v(x) = \frac{x^2}{2}$

$$I = \left[u(x) \cdot v(x) \right]_1^e - \int_1^e u'(x) v(x) \, dx.$$

$$= \left[\frac{x^2}{2} \ln x \right]_1^e - \int_1^e \frac{x}{2} \, dx.$$

$$= \left[\frac{x^2}{2} \ln x - \frac{x^2}{4} \right]_1^e$$

$$= \left(\frac{e^2}{2} \ln e - \frac{e^2}{4} \right) - \left(\frac{1}{2} \ln 1 - \frac{1}{4} \right)$$

$$= \frac{e^2}{2} - \frac{e^2}{4} + \frac{1}{4} = \boxed{\frac{e^2+1}{4}}$$